

REMARKS

Reconsideration and allowance of the present amended claims is respectfully requested. Claim 1 has been amended to include the recitations of previously presented claim 17. No new matter has been added. Moreover, Applicants note that the Office Action states that only claims 1-16 are pending in the application, yet Applicants submitted a preliminary amendment, in which claims were amended and added, and according to applicants records there are 22 currently pending claims. A copy of the previously submitted Preliminary Amendment is attached.

In the Office Action, the Examiner first rejected claims 1-16 under 35 U.S.C. § 102(b) as being anticipated by Corr, Stuart (US20020007640). Applicants respectfully traverse the rejection.

Corr, Stuart describe a flushing composition containing a lubricant, such as a polyalkylene glycol and/or a polyol ester, especially neopentyl polyol ester (cf. paragraph [0027]) and an amphiphilic deposit removal component likes esters of polyalkylene glycols (cf. paragraph [0035]). The flushing composition of Corr, Stuart is used in a process for changing the refrigerant in automotive air conditioning systems and domestic and industrial and commercial refrigeration systems (paragraph [0014]).

The process disclosed in Corr, Stuart comprises the following steps: removing the old refrigerant system, charging the disclosed flushing composition, removing the flushing composition and charging the new refrigerant system (cf. paragraph [0015]). The old refrigerant system typically comprised a chlorofluorocarbon refrigerant and a mineral oil lubricant (cf. paragraph [0020]). The new refrigerant system is one free of chlorine atoms and briefly mention in passing that the system could contain carbon dioxide as a refrigerant (cf. paragraphs [0022] and [0024]) and a lubricant like a polyalkylene glycol and/or a neopentyl polyol ester (cf. paragraph [0027]).

Furthermore, Corr, Stuart teach that the new refrigerant system could contain additional agents like triphenyl phosphate, triphenyl cresyl phosphate, dicresyl phenyl phosphate and tricresyl phosphate.

Despite these disclosures, Applicants respectfully submit that Corr, Stuart cannot be relied upon as an anticipatory reference because Corr, Stuart do not disclose, teach or suggest the required phosphate compound having aromatic substitutes comprising isopropyl or t-butyl groups as presently claimed.

Moreover, Corr, Stuart do not describe a refrigerant composition according to the present invention because, while Corr, Stuart briefly mention that the lubricant is useful in a refrigerant system comprising carbon dioxide, Corr, Stuart does not provide an example where carbon dioxide actually is used as the refrigerant. In contrast, in each and every example of Corr, Stuart, a hydrofluorocarbon is employed as the refrigerant. Thus, Corr, Stuart provides no guidance to a person of ordinary skill in the art as to a refrigerant system containing carbon dioxide. Hydrofluorocarbons and carbon dioxides refrigerants have significantly different physical and chemical properties, such as the use of higher operating pressures (therefore requiring the presence of a proper high pressure additive to reduce wear), solubility in the lubricant, possible thinning out resulting from lubricant solubility issues (normally connected with an unwanted viscosity drop) and degasification effects.

Thus, because Corr, Stuart does not disclose the presently claimed phosphate ester and does not teach or suggest (or exemplify) the presently claimed carbon dioxide refrigerant based operating agent, Applicants respectfully request withdrawal of the anticipation rejection.

In the Office Action, the Examiner next rejected claims 1-16 under 35 U.S.C. § 102(b) as being anticipated by Hagihara (US6096692). Applicants respectfully traverse this rejection.

Hagihara describes a lubricant comprising cyclic ketals or cyclic acetals and a refrigerant comprising a lubricant and a hydrofluorocarbon (cf. col. 7, lines 45-48).

The lubricant is reported to have good performance with respect to compatibility with hydrofluorocarbon refrigerants (cf. col. 5, lines 20-23). Hagihara also discloses that the refrigerant may comprise many other very different additional agents, one of which is tris(2,4-di-tert-butyl phenyl)phosphate. However, nowhere in Hagihara is the use of carbon dioxide instead of hydrofluorocarbons taught as a refrigerant. The only recitation relied on by the examiner to show carbon dioxide as a being disclosed by Hagihara, in fact, represents a teaching away from having carbon dioxide as a refrigerant, specifically stating that it is a problem if non-condensable carbon dioxide gas is generated. This is not a teaching to include carbon dioxide as the refrigerant, as presently claimed, but is a teaching as to what the Hagihara composition should not include (components that would in situ generate carbon dioxide gas). Thus, Hagihara describes that carbon dioxide would not be formed, because components that could lead to its generation specifically are to be avoided.

Thus, Hagihara discloses only systems containing hydrofluorocarbons as the refrigerant. Because the physical and chemical properties of hydrofluorocarbons and carbon dioxide are very different, Hagihara provides no disclosure to a person of ordinary skill in the art as to the problems of a system containing carbon dioxide as the refrigerant and what high pressure additives are appropriate for such a system. For example, carbon dioxide requires significantly higher operating pressures compared to hydrofluorocarbons. A high pressure additive to reduce wear is therefore very important in a carbon dioxide refrigerant system, as opposed to a hydrofluorocarbon system.

Other difficulties with carbon dioxide are the solubility of the carbon dioxide in the lubricant, a possible thinning out resulting therefrom (normally connected with an unwanted viscosity drop) and degasification effects. These difficulties are set forth in more detail on page 2 of the originally filed English specification of the present invention. Thus, clearly, Hagihara discloses a completely different refrigeration system and applicants respectfully submit that Hagihara does not anticipate the present claimed invention.

Next, the Examiner rejected Claims 1-16 under 35 U.S.C. § 102(b) as being anticipated by Osumi (US6692654). Applicants respectfully traverse the rejection.

Osumi describes a refrigerant system comprising carbon dioxide, an ester oil comprising a polyol ester and a phosphorus compound. As the phosphorus compound, Osumi mentions triphenyl phosphate, tricresyl phosphate, trixylyl phosphate, cresyl diphenyl phosphate or xylyl diphenyl phosphate (cf. col. 7, lines 18-20). Thus, only methyl substituted triphenyl phosphate compounds are mentioned. The substituents of the presently claimed invention are t-butyl and isopropyl, which are much larger than the methyl group and have a very different steric demand and electron pushing quality.

The Examiner's attention also is directed (with regard to this rejection and those over all the applied prior art in the office action) to Table 2 of the present disclosure which shows that the t-butylated (additive A) and isopropylated (additive B) phosphates provide overwhelming improvements in useful life over the cresyl (methylated additive C) phosphate.

Thus, Applicants respectfully submit that the failure of the Osumi reference to disclose or teach the claimed phosphates of the present invention requires withdrawal of the section 102 rejection over Osumi.

Lastly, in the Office Action, the Examiner rejected claims 1-16 under 35 U.S.C. § 102(b) as being anticipated by Corr (US6849583). Applicants respectfully traverse the rejection.

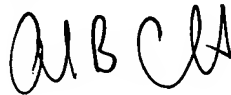
Corr describes a lubricant composition containing a lubricant such as polyalkylene glycols and/or polyol esters, especially neopentyl polyol esters (cf. col. 5, line 66 to col. 6, line 4) and an amphiphilic deposit removal component like esters of polyalkylene glycols (cf. col. 5, lines 26-27). The lubricant also is disclosed in passing as suitable for carbon dioxide as refrigerant (cf. col. 2, lines 58-61). Corr further describes that the lubricant may contain additional agents like triphenyl phosphate, diphenyl cresyl phosphate, dicresyl phenyl phosphate and tricresyl phosphate (cf. col. 11, lines 56-58).

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Our Docket No.: 1085-033

Thus, Corr does not describe the claimed phosphate agents and cannot anticipate the present claimed invention. Moreover, while Corr mentions in passing that carbon dioxide is a suitable refrigerant, Corr (like Corr, Stuart) does not provide a teaching wherein carbon dioxide actually is used as the refrigerant. All examples were performed with hydrofluorocarbons. Thus, as with Corr, Stuart, Corr provides no guidance to the person of ordinary skill in the art as to proper additives for use with carbon dioxide refrigerant systems.

Early and favorable action is earnestly solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'A B C L', is written over the typed name.

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1085-033

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Jörg Fahl et al.

Serial No.: Not yet assigned

Group Art Unit: not yet assigned

Filed: Concurrently herewith

Examiner: not yet assigned

For: OPERATING AGENT FOR CARBON DIOXIDE REFRIGERATING AND
AIR CONDITIONING EQUIPMENT

New York, NY 10036

June 29, 2004

Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Sir:

Before calculating the filing fee and before examination please amend the
above-identified application as follows:

Amendments to the Claims begin on page 2 of this paper.

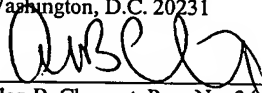
Remarks begin on page 7 of this paper.

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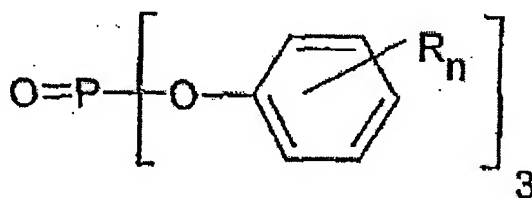

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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) Operating agent composition comprising
 - (A) carbon dioxide as refrigerant,
 - (B) polyalkylene glycols and/or neopentyl polyol esters as lubricant and
 - (C) a phosphate ester with the following structure:



wherein

R optionally, identically or differently for each of the three phenyl moieties and optionally, identically or differently for each n, represents H one or more C1 to C6 hydrocarbon moieties and

n optionally identically or differently for each of the three phenyl moieties represents an integer of 1 to 5, with the proviso that for at least one of the three phenyl moieties R is a C2 to C6 hydrocarbon preferably ~~t-butyl and/or isopropyl~~.

2. (Currently amended) Operating agent composition according to claim 1 comprising the said phosphate ester in a quantity of 0.1 to 3 % by weight, based on the lubricant.

3. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said polyalkylene glycols comprise no free hydroxy groups.
4. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said operating agent composition comprises polyalkylene glycols which, based on the polymer chain and the alkylene oxide monomer units used, consists of
- essentially exclusively monomer units of the type
 $-(\text{CH}(\text{CH}_3)\text{-CH}_2\text{-O})-$ or $-(\text{CH}_2\text{-CH}(\text{CH}_3)\text{-O})-$,
 - 20 to 80% monomer units of the type $-(\text{CH}(\text{CH}_3)\text{-CH}_2\text{-O})-$ or $-(\text{CH}_2\text{-CH}(\text{CH}_3)\text{-O})-$ and for the remaining residue of monomer units of type $-(\text{CH}_2\text{-CH}_2\text{-O})-$ or
 - 20 to 80% monomer units of the type $-(\text{CH}(\text{CH}_2\text{CH}_3)\text{-CH}_2\text{-O})-$ or $-(\text{CH}_2\text{-CH}(\text{CH}_2\text{CH}_3)\text{-O})-$ and for the remaining residue of monomer units of type $-(\text{CH}_2\text{-CH}_2\text{-O})-$.
5. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said operating agent composition comprises polyalkylene glycols and/or their mixtures ~~which have~~ having an a number average molecular weight (~~number-average~~) of 200 to 3000 g/mole, particularly preferably of 400 to 2000 g/mole.
6. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said polyalkylene glycols comprise aryl groups or heteroaromatic groups which may optionally be substituted with linear or branched alkyl groups or alkylene groups, ~~wherein the alkyl groups or alkylene groups have a total of preferably 1 to 24 carbon atoms.~~

7. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said polyalkylene glycols have the following end groups
- alkyl, aryl, alkylaryl, aryloxy, alkoxy, and/or alkylaryloxy end groups with having 1 to 24 carbon atoms.
8. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said operating agent composition comprises esters or an ester mixture, wherein the said esters are obtainable by reacting neopentyl polyols, ~~particularly preferably pentaerythritol, dipentaerythritol and/or tripentaerythritol,~~ with linear and/or branched C4 to C12 carboxylic acids, optionally with an addition of C4 to C12 dicarboxylic acids.
9. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the operating agent comprises neopentyl polyol esters and polyalkylene glycols.
10. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said operating agent composition comprises at least 10% by weight of said polyalkylene glycols and said neopentyl polyesters ~~according to one of the preceding claims~~, based on all the constituents of the said operating agent.
11. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said operating agent consists predominantly, apart from the said phosphate esters and the said refrigerant, ~~preferably exclusively,~~ of said polyalkylene glycols and said neopentyl polyesters ~~according to one of the preceding claims~~, based on the proportion by weight.
12. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the operating agent

additionally comprises a diphenyl amine, a di(C1 to C16 alkyl) phenyl amine as antioxidant and/or ~~these compounds~~ a diphenyl amine in which one or two phenyl groups have been exchanged for ~~naphthyl~~ naphthyl groups.

13. (Currently amended) Operating agent composition according to ~~one of the preceding claims~~ claim 1, ~~characterised~~ characterized in that the said phosphate ester ~~have,~~ has at least for one of the said phenyl moieties moieties, an R which is tert-butyl and/or isopropyl.

14. (Currently amended) ~~Use of the operating~~ Operating agent composition according to ~~one of the preceding claims~~ claim 1 for use in refrigerating machines, ~~preferably in motor vehicles.~~

15. (Currently amended) ~~Use of the operating~~ Operating agent composition according to ~~one of claims~~ claim 1 to 13 for use in freezing equipment (having evaporation temperatures of less than -30°C), wherein lubricants are used which comprise more than 90% by weight of neopentyl polyol esters.

16. (Currently amended) ~~Use of the operating~~ Operating agent composition according to ~~one of claims~~ claim 1 to 13 for use in air conditioning equipment of cars, wherein lubricants are used which comprise more than 90% of polyalkylene glycols.

17. (New) Operating agent composition according to claim 1, wherein R is t-butyl and/or isopropyl.

18. (New) Operating agent composition according to claim 5, wherein said polyalkylene glycols and/or their mixtures have a number average molecular weight of 400 to 2000 g/mole.

19. (New) Operating agent composition according to claim 6, wherein the alkyl groups or alkylene groups have a total of 1 to 24 carbon atoms.
20. (New) Operating agent composition according to claim 8, wherein said neopentyl polyols comprise pentaerythritol, dipentaerythritol and/or tripentaerythritol.
21. (New) Operating agent composition according to claim 11, wherein said operating agent consists exclusively, apart from said phosphate esters and said refrigerant of said polyalkylene glycols and said neopentyl polyesters.
22. (New) Operating agent composition according to Claim 14 wherein said refrigerating machine is in a motor vehicle.

REMARKS

Consideration and allowance of the present amended claims is respectfully requested. Applicant has amended the claims in this preliminary amendment to remove multiple dependencies and employ language more in conformance with United States practice. Additionally, new Claims 17-22 have been added to recite the preferably clauses of the claims as dependent claims. No new matter has been added.

Early and favorable action is earnestly solicited.

Respectfully submitted,



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